

**MODIS Algorithm Team (MAT)
Meeting Minutes, 2FEB94**

ATTENDEES:

Abel, Peter	Goodwin, Dave
Anuta, Paul	Guenther, Bruce
Ardanuy, Philip	Knight, Edward
Baden, Joan <i>Rapporteur</i>	Knowles, Daniel
Barnes, Bill	Kvaran, Geir
Braun, Charles	Maxwell, Marvin
Brown, Ken	McKay, Al
Bryant, Tom	Montgomery, Harry <i>Chair</i>
Che, Nianzeng	Solomon, Carl
Goff, Tom	Ungar, Stephen
Goldberg, Larry	Zukowski, Tmitri J.

MINUTES:

Harry Montgomery gave a brief description of MODIS, and then presented a memorandum stating the formation of the MODIS Algorithm Team (MAT) and its primary objectives, team approach, resources, meeting times, and document distribution procedures (Attachment 1). Harry then stated that he would lead the MODIS Algorithm Team, and that all were invited to participate, and provide insight into the development of the calibration of the MODIS instrument. He stated that no job role would be "fixed", and that everything was open to discussion and change to make this team work. Tom Bryant presented a list of MAT actions (Attachment 2). Dan Knowles presented a list of pertinent SBRC documents from Jim Young (Attachment 3).

The next meeting has been scheduled for Wednesday, February 9, 1994, from 9 - 11AM, in Building 22, Room 271.

Action Items (Assigned FEB 2, 94):

- 1.MAT Dan Knowles to give a brief (15min) Blackbody Assembly(BBA) presentation on Section 3, CDRL 404, Operational In-Flight Calibration Procedures at 9FEB94 MAT meeting.
- 2.MAT Tom Goff to give a 15 minute presentation, "L-1A SDST Scan Cube for MODIS" at the 9FEB94 MAT meeting.
- 3.MAT Tom Goff to give a 10 minute presentation, "SDST Expected Algorithm Deliverables" at the 9FEB94 MAT meeting.
- 4.MAT Ed Knight to give a brief presentation (30min) on Section 6, SRCA , CDRL 404, Operational In-Flight Calibration Procedures at 9FEB94 MAT meeting.
- 5.MAT Paul Anuta to give a brief presentation (20min) on Section 4&5, SDA & SDSM , CDRL 404, Operational In-Flight Calibration Procedures at 9FEB94 MAT meeting.
- 6.MAT Montgomery and Abel to get schedules together by 9FEB94 MAT meeting.
- 7.MAT Joan Baden to provide addresses, email listing, and phone #s for MAT Team at 9FEB94 MAT meeting.
- 8.MAT Joan Baden to provide 25 copies of CDRL 404, Operational In-Flight Cal. Procedures.

Goddard Space Flight Center
Greenbelt, Maryland
20771

Attachment 1

Reply to Attn of: 925

February 1, 1994

TO: Distribution

FROM: Harry Montgomery *Harry*
MODIS Characterization Support Team (MCST)

SUBJECT: Formation of the MODIS Algorithm Team (MAT)

The Head of the MODIS Calibration Support Team (MCST) has requested the formation of the MODIS Algorithm Team (MAT). The immediate objectives of MAT are to

- examine and understand the physical principles and engineering details of the MODIS and its onboard calibrators;
- derive the general theoretical form of algorithms

$\text{Input} = f(\text{Output}, V_1, V_2, \dots, C_1, C_2, \dots)$

where the V_i are variables of the systems, such as temperatures at monitored points, and the C_j are coefficients to be fitted. MODIS output is always counts, and the input could be radiance, spectral response function, etc.;

- determine and verify the optimal V_i and C_j based on thermal vacuum (T/V) data. This process will be achieved using techniques that divide the T/V data into statistically independent parts;
- provide algorithms for calibration uncertainty using T/V data; and
- deliver these algorithms, fully documented, in accordance with a schedule imposed by MCST.

A list of MAT members is attached. The MAT will meet every Wednesday morning at 9 a.m. The first meeting will be on February 2 to discuss MAT member responsibilities and schedules. Please contact me if you have additional suggestions.
(301) 286-7087).

cc:

Peter Abel/GSFC/925
Ken Anderson/GSFC/421
Paul Anuta/RDC
Phil Ardanuy/RDC
Joan Baden/RDC
John Barker/GSFC/925
Bill Barnes/GSFC/970
Charles Braun/RDC
Ken Brown/GSFC/925
Tom Bryant/RDC
John Burelbach/RDC
Jim Butler/GSFC/925
Nianzeng Che/Swales & Assoc.
Tom Goff/RDC
Larry Goldberg/Swales & Assoc
Bruce Guenther/GSFC/925
Joann Harnden/GSFC/925
Ed Knight/RDC
Dan Knowles/RDC
Geir Kvaran/RDC
Marvin Maxwell/Swales & Assoc.
Harry Montgomery/GSFC/925
Steve Ungar/923
Nicole White/RDC
Tim Zukowski/Swales & Assoc.

MODIS ALGORITHM TEAM (MAT) (1/31/94)

° OBJECTIVE:

-PREPARE AND JUSTIFY ALGORITHMS FOR THE CALIBRATION AND ERROR ANALYSIS RELATIVE TO THE MODIS SCIENTIFIC REQUIREMENTS AND DELIVER¹ THEM TO MCST

° TEAM² APPROACH:

-UNDERSTAND THE END-TO-END MODIS SYSTEM³
-COLLECT AND DIGEST INFORMATION FROM SBRC AND OTHER RELEVANT SOURCES
-PREPARE INITIAL ALGORITHMS
-EVALUATE ALGORITHMS WITH THERMAL VACUUM DATA IN NEAR REAL TIME
-ASSESS AND REPORT ADEQUACY OF THERMAL VACUUM DATA IN NEAR REAL TIME
-PREPARE FINAL ALGORITHMS

° REQUESTED RESOURCES⁴:

-TEAM MEMBERSHIP
-TRAVEL
-DATA ACCESS⁵ AND PROCESSING CAPABILITY
- RESOURCES (1/31/94)

1 A CRITICAL ALGORITHM REVIEW WILL BE HELD PRIOR TO DELIVERY

2 THE MODIS ALGORITHM TEAM (MAT) WILL CONSIST OF GSFC CIVIL SERVANTS AND ON-SITE CONTRACTORS AND WILL INITIALLY MEET ONCE PER WEEK TO ACTIVELY REVIEW ACTION ITEMS
MAT IS A SUB-GROUP OF MCST.

3 THE SYSTEM INCLUDES ANYTHING WHICH AFFECTS THE CALIBRATION QUALITY, INCLUDING GROUND TRUTH

4 SEE PAGE ATTACHMENT

5 TO HAVE HIGH CONFIDENCE IN THE ADEQUACY OF THE CHARACTERIZATION DATA WE NEED THE CAPABILITY TO ADJUST THE TESTING PROCEDURE IN NEAR REAL TIME (WITHIN ONE DAY). THIS IMPLIES A SUN-COMPATIBLE WORKSTATION NETWORK AT GSFC AND INITIALIZED WITH SBRC CODE IN THE C LANGUAGE

RESOURCES (1/31/94)

° TEAM MEMBERSHIP

FUNCTION/RESPONSIBILITY	NAME
TEAM LEADER	HARRY MONTGOMERY
TEAM LEADER ALTERNATE	PETER ABEL
CONSULTANT	MARVIN MAXWELL
PRE-LAUNCH TESTING	TIM ZUKOWSKI
SRCA ALGORITHMS	ED KNIGHT, TBD
SD & SDSM ALGORITHMS	PAUL ANUTA/JIM BUTLER/TOM BRYANT
BB ALGORITHMS	DAN KNOWLES
SV/LUNAR	TOM BRYANT
GHOSTING/CROSS TALK	KEN BROWN
GROUND TRUTH HOOKS	PETER ABEL/NIANZENG CHE
DATA SYSTEMS (FORMAT/TIMING)	TOM BRYANT/TIM ZUKOWSKI
C++ PROGRAMMING INTERFACE	TBD
C++ PROGRAMMER	TOM BRYANT/JOAN BADEN/TBD
DATA ANALYST	NIANZENG CHE
ON-SITE REPRESENTATIVE AT SBRC	TBD (KEN ANDERSON?)
RAPPORTEUR	JOAN BADEN/NICOLE WHITE
HI-LEVEL DATA TECH	TBD
FLIGHT SOFTWARE	SBRC/TBD

CONTRACTOR TRAVEL \$5.0K/MO
 CIVIL SERVANT TRAVEL \$1.0K PER MONTH

° ASSUMES A SPARC10/40 WORKSTATION NETWORK TO BE PROVIDED FROM OTHER RESOURCES

Document Distribution

Current Documents

- Received by Ed Knight on Tuesday (6-2382, 22/C148)
- Distributed by Admin support by Weds COB

Steps to acquire archived documents:

1. MODIS Algorithm Team - see appropriate specialist
2. MODARCH -see Mike Heney for instructions 286-4044/
rm: C115/mheney@Ltpsun
3. MODIS Documentation Archive - see Nicole White 286-1378
Dan Knowles TBD
Ed Knight 286-2382
4. Mission to Planet Earth Library - see Linda Fatahi-Yar 286-5641/
bld. 16W/rm: N88

Civil Servants: May request a copy of the documents

Contractors: May borrow documents overnight

Current SBRC (Jim Young) List will be distributed

**MODIS ALGORITHM TEAM
(MAT)
SCHEDULED MEETINGS
1994**

Day	Date	Room	Time
Wed	Feb 2	BLDG 22/G95	9-11AM
Wed	Feb 9	BLDG 22/271	9-11AM
Wed	Feb 16	BLDG 22/G95	9-11AM
Wed	March 2	BLDG 22/G95	9-11AM
Mon	March 7	BLDG 22/G95	9-11AM
Wed	March 16	BLDG 22/G95	9-11AM
Wed	March 30	BLDG 22/G95	9-11AM
Mon	April 4	BLDG 22/G95	9-11AM
Mon	April 11	BLDG 22/G95	9-11AM
Mon	April 25	BLDG 22/G95	8:30-10AM
Mon	May 2	BLDG 22/G95	9-11AM
Mon	May 9	BLDG 22/G95	9-11AM
Mon	May 16	BLDG 22/G95	9-11AM
Mon	May 23	BLDG 22/G95	9-10AM
Mon	May 30	BLDG 22/G95	9-11AM
Mon	June 6	BLDG 22/G95	9-11AM
Mon	June 13	BLDG 22/G95	9-11AM
Mon	June 20	BLDG 22/G95	9-11AM
Mon	June 27	BLDG 22/G95	9-11AM
Wed	July 6	BLDG 22/G95	9-11AM

Action Items (2/2/94)

1) Design and code a program that given a specific time calculates the position of the sun with respect to the solar diffuser.

Specifically, compute the:

- Azimuth and elevation of the sun vector with respect to the diffuser coordinate system
- Sun to EOS distance
- Distance from the sun - EOS line from the earth's surface
- Errors involved with these calculations

2) Design and code a program which will calculate the location of the moon in the MODIS coordinates. Incorporate parameters to allow for roll, pitch and yaw of the EOS platform in the program. Study location of moon with respect to space port and nadir.

(Mid March)

3) Research the hardware and software configuration of a Sun Sparc 10 which will allow this machine to run the SBRC MODIS ground test procedures on the data that SBRC has captured.

Discuss the advantages/disadvantages with putting the Workstation 1) at SBRC or 2) at GSFC.

(Next week)

Attachment 3

Subject: SBRC Bibliography

Date: 20 Jan 93

From: Dan Knowles

Enclosed is a list compiled by Jim Young of pertinent SBRC documents. I searched the MSCT archive to determine which documents we currently possess. I have placed a check mark next to documents which we do have, and placed our identification number above the SBRC number. I have placed a "X" next to documents which we do not currently possess. The rest of the document (which have SBRC PL3095 numbers) are SBRC weekly submissions. It is highly likely that we possess all of these documents.

For assistance contact: Nicole White 286-1378
 Dan Knowles TBD
 Ed Knight 286-2382

PL3095-N01790 IM entitled "Review Of MODIS Characterization and Calibration Philosophy" from J. B. Young dated 16 Nov 1992

PL3095-N01370 IM entitled "MTF, Registration and Radiometric Accuracy" from T. S. Pagano dated 27 July 1992

PL3095-N01338 IM entitled "Spectral Band Registration (SBR) Conceptual Measurement Methodology" from J. B. Young dated 20 July 1992

PL3095-N01166 IM entitled "Crosstrack Radiometric Model Bands 29 and 30" from J. B. Young dated 25 June 1992

PL3095-N01047 IM entitled "MODIS-N Conceptual Characterization Calibration Methodology" from J. B. Young dated 30 April 1992

✓✗	CDRL # 022	Performance Verification Plan SBRC # 151844 submitted Jan 1994
✓✗	CDRL # 101	Radiometric Math Model (RMM) (Final Report) submitted Dec 1993
✓✗	CDRL # 404	Operational In-Flight Calibration Procedures (preliminary) submitted Dec 1993
✓	SBRC-D1149 CDRL # 018	Calibration Management Plan submitted Sept 1992
✓	SBRC-D2388 CDRL # 019	Calibration Peer Review Data Package submitted Sept 1992

✓	^{D0156} SBRC #E151788	Spectroradiometric Calibration Assembly, Specification for
✗	SBRC #151788	Spectroradiometric Calibration Assembly, Specification for
✓	^{D0147} SBRC #E151789	Solar Diffuser Assembly, Specification for
✗	SBRC #151789	Solar Diffuser Assembly, Specification for
✓	^{D0145} SBRC #E151790	Blackbody Assembly, Specification for
✗	SBRC # 151790	Blackbody Assembly, Specification for
✓	^{SBRC-D1145} SBRC #E151791	Solar Diffuser Stability Monitor, Specification for
✗	SBRC #151791	Solar Diffuser Stability Monitor, Specification for
✗	SBRC # 151868	Ambient Calibration and Testing (AC) Support Software, Requirements for

- × SBRC # 151874 MODIS Ground Based Calibrator System Assembly (MGBC)
- × SBRC # 151891 SBR / MTF & Spurious Response Assembly (SMSR)
- × SBRC # 151892 Spectral Measurement Assembly (SMA)
- × SBRC # 151893 Polarization Measurement Assembly (PMA)
- × SBRC # 151894 Alignment & Pointing Assembly (APA)
- × SBRC # 151872 Integration and Alignment Collimator (IAC)
- × SBRC # 152448 Angle Interferometer System for the Integration and Alignment Collimator
- × SBRC # 151857 Integration and Alignment Test Set Software Specification
- × SBRC # 151873 Spherical Integration Source 110 cm (SIS(100))
- × SBRC # 151875 Blackbody Calibration Source (BCS)
- × SBRC # 151876 Space View Source (SVS)

SRCA
SPECTRORADIOMETRIC CALIBRATION ASSEMBLY
CDR SUPPLEMENTAL DATA PACKAGE INDEX

SPECIFICATION

X SBRC #151788 Spectroradiometric Calibration Assembly, Specification for

GENERAL DESIGN

PL3095-Q00858 "IR/SW Beamsplitter Option for SRCA Sources" from
S. Pellicori dated 26 Mar 1992

PL3095-Q01118 "MODIS-N SRCA Baseline Design" from E. Johnson
dated 15 May 1992

 "Response to PDR Questions/Concerns/Action Items"
from E. H. Johnson dated 6 Nov 1992

PL3095-Q01846 "Requested SRCA Design Changes" from
E. H. Johnson dated 24 Nov 1992

 "SRCA FILTER DEFINITION" from E. Johnson dated
4 March 1993

 "Response to Requests for SRCA Filter Definition" from S. Pellicori
dated 25 March 1993

 "Order-Isolation Filter Descriptions for SRCA" from S. Pellicori
dated 13 April 1993

PL3095-Q02762 "SRCA to MODIS Alignment" from E. Johnson dated 12 July 1993

OPTICAL DESIGN AND TOLERANCE ANALYSIS

PL3095-Q01117 "Optical Design of the MODIS-N SRCA" from
C. Wells dated 15 May 1992

 "SRCA Monochromator Optics Torics vs Parabolas"
from Harvey Spencer dated 6 Aug 1992

PL3095-Q02349 "SRCA Tolerance Analysis" from E. Johnson dated
29 March 1993

PL3095-Q02350 "Sizing of Clear Apertures for SRCA Source,
Monochromator, and Collimator Optics" from R. S.
Kebo dated 29 March 1993

STRAY LIGHT ANALYSIS

- PL3095-Q02373 "Preliminary Stray Light Analysis of the SRCA" from Terry D. Ferguson dated 6 April 1993
- PL3095-Q02879 "Strut Geometry versus Scatter in the SRCA Collimator" from Terry D. Ferguson dated 4 Aug 1993

STRUCTURAL ANALYSIS

- PL3095-R03293 "MODIS SRCA Structural Analysis Report" from E. L. Tani dated 2 Dec 1992

THERMAL ANALYSIS

- PL3095-M01272 "SRCA Preliminary Thermal Design" from P. E. Bortfeldt dated 6 June 1992
- PL3095-R03279 "SRCA Detailed Thermal Analysis" from J. Bauer and P. Bortfeldt dated 19 Nov 1993

SPECTRAL PERFORMANCE

- PL3095-N01337 "SRCA Performance Sensitivity to Thermal Effects" from J. B. Young dated 20 July 1992
- PL3095-N01440 "Effects of SRCA Obscuration "Beam Walk" on Measurement of Spectral Profiles" from T. S. Pagano dated 13 Aug 1992
- PL3095-N01778 "Simulation of MODIS SRCA spectral calibration" from J. Lansing dated 5 Nov 1992
- PL3095-Q01904 "SRCA Entrance Slit Curvature" from E. H. Johnson dated 10 Dec 1992
- PL3095-Q00994-A "Two Grating Approach for SRCA Design (Revisited)" from E. Johnson dated 21 Dec 1992
- PL3095-Q02020 "SRCA Spectral Measurement Accuracy" from E. Johnson dated 13 Jan 1993
- PL3095-Q01904-A "SRCA Monochromator Slit Curvature Analysis" from R. S. Kebo dated 16 March 1993

VIS/SWIR SOURCE

PL3095-Q00546 "Pros/Cons for SRCA VIS/SWIR Source Approaches" from E. H. Johnson dated 14 Jan 1992

PL3095-N00536 SRCA VIS/NIR/SWIR Radiant Energy Source Approach" from J. B. Young dated 15 Jan 1992

PL3095-W00586 "SRCA Lamp/Control Loop" from E. D. Aasted dated 24 Jan 1992

PL3095-Q01675 "SRCA Radiance Stability with 1% Power Supply Ripple" from Ted Shrode dated 7 Oct 1992

PL3095-Q02071 "Radiometric Stability of SRCA VIS/SWIR Source" from E. Johnson dated 22 Jan 1993

PL3095-I02361 " Short-term stability, SRCA" from B. Guenther dated 7 April 1993

PL3095-Q03202 "Modeling and Testing of SRCA SIS Radiant Output" from Eric Johnson dated 29 Oct 1993

LAMPS

PL3095-Q00964 "SRCA Lamp Testing Outline" from E. H. Johnson dated 16 Apr 1992

PL3095-V01712 "Vibration and Thermal Testing of MODIS SRCA Calibration Lamps" from Jon Mello dated 20 Oct 1992

PL3095-Q02806 "Halogen Lamp De-rating Requirement" from E. Johnson dated 21 July 1993

PL3095-Q03178 "Life Considerations for SRCA Incandescent Lamps" from Eric Johnson dated 22 Oct. 1993

× SBRC #85131 Lamp, Miniature, Incandescent Halogen Lamp

× SBRC #85132 Lamp, Miniature, Incandescent Vacuum Lamp

× SBRC #152871 Screening and Qualification Test Procedure, Miniature Incandescent Halogen Lamps

× SBRC #152872 Screening and Qualification Test Procedure, Miniature Incandescent Vacuum Lamps

OPERATIONAL USAGE

- PL3095-Q01474 "SRCA Motor Requirements (and Operational Scenarios) from E. H. Johnson dated 12 Aug 1992
- "Updated MODIS SRCA Radiometric Calibration Sequence" from J. Mehrten dated 11 Nov 1993
- PL3095-Q03146 "SRCA Calibration Algorithms" from E. Johnson dated 12 Oct 1993
- X PL3095-I03443 "Frequency of Use of the On-Board Calibrators - NASA Estimate" from J. Young dated 5 Jan 1994

PROCEDURES

- X SBRC #_____ Preliminary SRCA Alignment Procedure

ELECTRONICS

- X Design Review (Electronics) dated 4 Dec 1992

MOTORS/ACTUATORS

- X "On-Board Calibrator Mechanisms", from MODIS Mechanisms Delta Preliminary Design Review dated April 2, 1993

BBA
BLACKBODY ASSEMBLY
CDR SUPPLEMENTAL DATA PACKAGE INDEX

SPECIFICATION

X SBRC # 151790 Blackbody Assembly, Specification for

GENERAL DESIGN

PL3095-N00264 "MODIS-N Blackbody Groove Design" from Jim Bell
dated 24 Oct 1991

PL3095-M01368 "Blackbody Temperature/Emissivity Trade"
from T. S. Pagano dated 22 July 1992

"MODIS Blackbody Size and Location" from Alice
Wang dated 17 June 1993

PL3095-N02719 "OBC BB Design Priorities" from J. B. Young
dated 6 July 1993

"Possible near term OBC BB tasks" from
J. B. Young dated 14 Aug 1993

X 93.8222.2738 "MODIS Blackbody 8/16/93 Action Items"
by Brian McComas dated 16 Aug. 1993

EMISSIVITY (MODELING & MEASUREMENT)

PL3095-N02590 "Conceptual Measurement Methodology reflectance/
emissivity of BB cavity" from J. Young dated 1 June 93

X 93.8222.2761 "An APART Look at V-Groove Blackbodies" from
T. Ferguson dated 2 Sept 1993

X 93.8222.2844 "MODIS V-groove Blackbody Modeling Using
ASAP" by D. T. Pelham dated 27 Oct. 1993

STRUCTURAL ANALYSIS

PL3095-R01565 "MODIS - Natural Frequencies of Blackbody" from T. Wolverton
dated 3 Sept 1993

PL3095-R02771 "MODIS - Blackbody Bracket Analysis" from T. Wolverton
dated 15 Aug 1993

PL3095-R03468 "MODIS - Blackbody Stress Analysis" from T. Wolverton
dated 5 Jan 1994

THERMAL ANALYSIS

- PL3095-N01339 "Thermal Conductivity of Paint OBC Blackbody" by
J. B. Young dated 26 July 1992
- "Blackbody Thermal Analysis Results to Date"
from Paul Bortfeldt dated 5 Aug 1992
- MODIS OBC BB thermal model presented at 21-23 Oct. 1992
PDR Vol. III pages163-174.

OPERATIONAL USAGE

- ✕ PL3095-I03443 "Frequency of Use of the On-Board Calibrators - NASA Estimate"
from J. Young dated 5 Jan 1994

ELECTRONICS

- PL3095-W00469 "Blackbody Heater Performance Requirements"
from E. D. Aasted dated 18 Dec 1991.
- PL3095-W00722 "Summary and Conclusions from Blackbody Mass Model
Testing " from E. D. Aasted dated 28 Feb 1992
- Design Review (Electronics) dated 27 August1992
- PL3095-W01556 "Blackbody Temperature Sensor" from E. D. Aasted
dated 2 Sept 1992
- "MODIS R-07 black body control considerations"
from D. Hanevich dated 23 June 1993

SDA
SOLAR DIFFUSER ASSEMBLY
CDR SUPPLEMENTAL DATA PACKAGE INDEX

SPECIFICATION

X SBRC #151789 Solar Diffuser Assembly, Specification for

GENERAL DESIGN

PL3095-M01274 "Radiometric Error of Earthshine" from T. Pagano dated 26 June 1992

PL3095-N001278 "The Solar Diffuser Albedo as a Function of Orbital Parameters" from G. R. Hyde dated 2 July 1992

PL3095-N01279 "Albedo_Calc: A Computer Program to Determine Solar Diffuser Albedo as a Function of the EOS Orbit Parameters" from G. R. Hyde dated 6 July 1992

PL3095-N001624 "The Solar Diffuser Albedo as a Function of Orbit Parameters for a 1:30 P.M. Orbit" from G. R. Hyde dated 24 Sept 1992

PL3095-N03008A "SD Inclination Angle Dictated by the Revised Solar Diffuser Albedo of 0.523" from G. R. Hyde dated 28 Oct 1993

PL3095-M03193A "Solar Diffuser Inclination Angle Required from the MODIS telescope and the Solar Diffuser Stability Monitor to View the Solar Diffuser at Equal Angles" from G. R. Hyde dated 29 Oct 1993; Revised 1 Nov 1993

PL3095-M03228 "SD Inclination Angle, 20.2 Degrees, Effect on MODIS Parameters" from G. R. Hyde dated 5 Nov 1993

DOOR AND SCREEN DESIGN

PL3095-N00479 "Design Philosophy for Solar Diffuser/Diffuser door" from J. B. Young dated 2 Jan 1992

PL3095-M02090 "MODIS Door Concept Update" from J. A. Mehrten dated 27 Jan 1993

PL3095-M02785 "Estimated Solar Diffuser Door Force Profiles MODIS" from W. Cushman dated 19 July 1993

PL3095-R03475 "Solar Diffuser Door Motor Lifetime" from W. Cushman dated 7 Jan, 1994

DIFFUSER MATERIAL (BRDF Modeling, Measurement & Stability)

- PL3095-N01431 "MODIS Solar Diffuser Material Evaluation/Selection Criteria" from J. B. Young dated 13 Aug 1992
- X 92-8222-2477 "Measurement Requirements Associated with Characterization of Solar Diffuser" from J. B. Young dated 8 Sept 1992
- PL3095-Q1921 "BRDF Measurement Facility" from Ted Shrode dated 17 Dec 1992
- PL3095-Q1920 "Elimination of YB-71 as a material for use on the Solar Diffuser" from Ted Shrode dated 17 Dec 1992
- PL3095-N02075 "Spectralon BRDF Measurement Methodology" from J. B. Young dated 28 Jan 1993
- "Reflectance stability analysis of Spectralon diffuse calibration panels" Carol Bruegge, Albert Stiegman, Daniel Coulter, Robert Hale, David Diner and Arthur Springsteen, SPIE Vol. 1493 (1991) pg. 132
- "Use of Spectralon as a diffuse reflectance standard for in-flight calibration of earth-orbiting sensors" Carol Bruegge, Albert Stiegman, Richard Rainen, and Arthur Springsteen, Optical Engineering April 1993 pg. 805
- "Ultraviolet stability and contamination analysis of Spectralon diffuse reflectance material" Albert Stiegman, Carol Bruegge, Arthur Springsteen, Optical Engineering April 1993 page 799
- "Modeling Spectralon's Bidirectional Reflectance for In-Flight Calibration of Earth Orbiting Sensors" Stephan P. Flasse, Michel M. Verstraete, Bernard Pinty and Carol Bruegge, SPIE Vol. 1938 (April 1993)
- "Effects of Space Shuttle Flight on the Reflectance Characteristics of Diffusers in the NIR, VIS and UV" Carol Bruegge, Albert Stiegman, Ernest Hilsenrath, Howard Herzig, and Donald Williams

STRUCTURAL ANALYSIS

- PL3095-R03370 "MODIS SD Preliminary Stress Analysis" from D. Paule dated 8 Dec 1993
- PL3095-R03514 "MODIS SD 1g Sag" from D. Paule dated 13 Jan 1994

OPERATIONAL USAGE

- X PL3095-I03282 "Duty Cycle of MODIS Solar Diffuser Door Mechanism" from J. Young dated 23 Nov 1993
- PL3095-N03286 "Solar Diffuser Calibration Usage Boundary Definition" from J. B. Young dated 30 Nov 1993

X PL3095-103443

"Frequency of Use of the On-Board Calibrators - NASA Estimate"
from J. Young dated 5 Jan 1994.

SDSM
SOLAR DIFFUSER STABILITY MONITOR
CDR SUPPLEMENTAL DATA PACKAGE INDEX

SPECIFICATION

× SBRC 151791 Solar Diffuser Stability Monitor, Specification for

GENERAL DESIGN

PL3095-N00524, "Design Philosophy of Solar Diffuser Stability Monitor (SDSM)"
from J. B. Young dated 13 January 1992.

PL3095-Q01119, "SDSM Baseline Design" from T. Shrode, et al,
dated 15 May 1992.

PL3095-N01349, "SDSM Solar Attenuation Screen" from J. B. Young
dated 20 July 1992

PL3095-N01710 "Equal Viewing Angles: SDSM, SMA to SD" from T. Pagano
dated 19 October 1992

"SDSM requirement modification notification" from Jim Young
dated 3 Nov. 1992

PL3095-Q02316 "Solar Diffuser Stability Monitor Issues" from Art Chapman
dated 10 March 1993.

"SDSM Lens Material Comparison" from R. S. Kebo dated 22
March 1993

PL3095-M03193A "Solar Diffuser Inclination Angle Required for the MODIS
Telescope and the Solar Diffuser Stability Monitor to view the
Solar Diffuser at Equal Angles" from G. R. Hyde dated 1 Nov 1993.

PL3095-M03228 "SD Inclination Angle, 20.2 Degrees, Effect on MODIS
Parameters" from G. R. Hyde dated 5 Nov 1993

PL3095-Q03243 "Declination Angles for SDSM" from Brian K. McComas
dated 9 Nov 1993

× 93.8222.2870 "SDSM Sun Opening in MODIS" from Brian K. McComas
dated 12 Nov 1993

OPTICAL DESIGN AND TOLERANCE ANALYSIS

PL3095-Q02874 "SDSM Tolerance Analysis" from R. S. Kebo dated 12 May 1993

PL3095-Q02873 "SDSM SD View Ray Traces" from Brian McComas
dated 3 August 1993

PL3095-Q03055 "SDSM Detector Motion Tolerances" from Brian K. McComas
dated 20 Sept 1993

PL3095-Q03042

"Checking CODE V Model of SDSM Sun View"
from Brian K. McComas dated 9 Nov 1993

X 93.8222.2888

"Optical Footprint on SDSM Fold Mirror" from Brian K. McComas
dated 24 Nov 1993

STRUCTURAL ANALYSIS

PL3095-R03394

"SDSM Structural Analysis" from B. Burton to be completed 4 Feb
1994

THERMAL ANALYSIS

PL3095-W03198

X "MODIS/SDSM Motor Controller Board Analysis" from Paul Drake
dated 2 Nov 1993

OPERATIONAL USAGE

"Draft MODIS SDSM Calibration Sequence" from J. Mehrten
dated 15 Nov 1993

X PL3095-I03282

"Duty Cycle of MODIS Solar Diffuser Door Mechanism"
from Jim Young dated 23 Nov 1993

X PL3095-I03443

"Frequency of Use of the On-Board Calibrators - NASA Estimate"
from J. Young dated 5 Jan 1994

ELECTRONICS

PL3095 -W01523

"SBRC Internal Preliminary Design Review of the MODIS Solar
Diffuser Stability Monitor" from E. D. Aasted dated 21 August 1992.

PL3095-W01588

"SDSM Internal Preliminary Design Review Action Items" from E.
D. Aasted dated 10 Sept. 1992

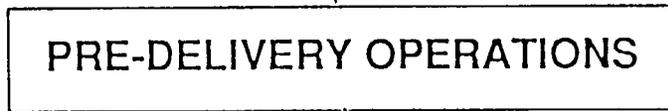
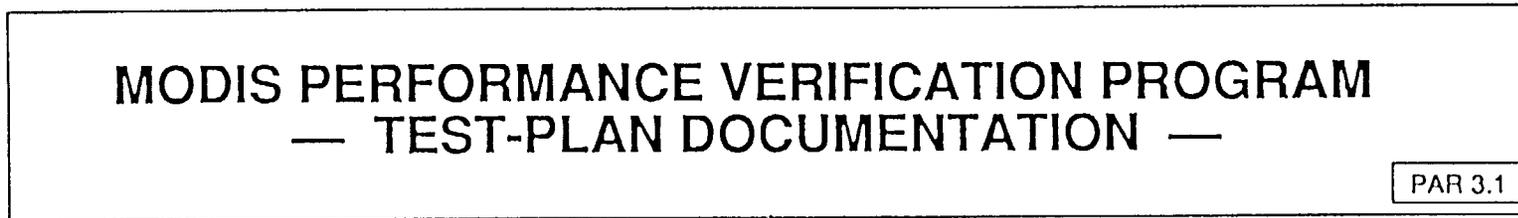
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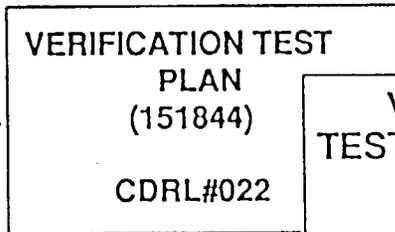
PERFORMANCE VERIFICATION PLAN DEFINES MODIS TEST PLAN



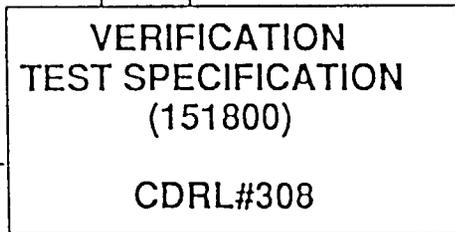
SANTA BARBARA RESEARCH CENTER
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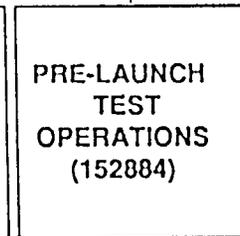
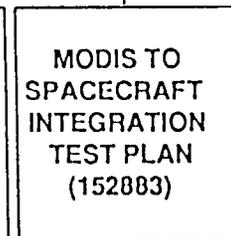
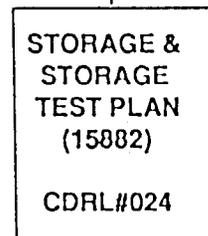
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PAR 3.2.1



PAR 3.2.2



• END-TO-END TEST OPS

PAR 3.7

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93-5